

The documentation and process conversion measures necessary to comply with this document shall be completed by 21 September, 2001.

INCH POUND

MIL-PRF-19500/578E  
21 June 2001  
SUPERSEDING  
MIL-PRF-19500/578D  
7 April 2000

## PERFORMANCE SPECIFICATION

SEMICONDUCTOR DEVICE, DIODE, SILICON, SWITCHING,  
1N6638, 1N6642, 1N6643, 1N6638U, 1N6642U, 1N6643U, 1N6638US, 1N6642US, 1N6643US,  
1N6642UB, 1N6642UB2, 1N6642UBR2, JAN, JANTX, JANTXV, JANJ, AND JANS

The JANS1N4148-1 will no longer be qualified. The JANS1N6642 will be used in place of the JANS1N4148-1. The 1N6638US, 1N6642US and 1N6643US are directly substitutable for the 1N6638U, 1N6642U, and 1N6643U.

This specification is approved for use by all Departments and Agencies of the Department of Defense.

### 1. SCOPE

1.1 Scope. This specification covers the performance requirements for switching diodes. Five levels of product assurance are provided for each device type as specified in MIL-PRF-19500.

1.2 Physical dimensions. See figures 1 (similar to DO-35), 2 (square endcap surface mount), 3, and 4.

1.3 Maximum ratings.  $T_A = +25^{\circ}\text{C}$ .

Types	$V_{BR}$	$V_{RWM}$	$I_O$ (1) (2)	$I_{FSM}$ $t_p = 1/120 \text{ s}$	$T_{STG}, T_J$	$R_{\theta JL}$ $L = .375$	$R_{\theta JEC}$ $L = 0$	$Z_{\theta JX}$
	<u>V (pk)</u>	<u>V (pk)</u>	<u>mA</u>	<u>A (pk)</u>	<u>°C</u>	<u>°C/W</u>	<u>°C/W</u>	<u>°C/W</u>
1N6638, 1N6638U, 1N6638US	150	125	300	2.5	-65 to +175	160	50	25
1N6642, 1N6642U, 1N6642US, 1N6642UB, 1N6642UB2, 1N6642UBR2	100	75	300	2.5	-65 to +175	160	50	25
1N6643, 1N6643U, 1N6643US	75	50	300	2.5	-65 to +175	160	50	25

(1) Derate at  $3.0 \text{ mA}/^{\circ}\text{C}$  above  $T_L = +75^{\circ}\text{C}$  for axial lead,  $L = .375$  inch (9.53 mm).

(2) Derate at  $4.6 \text{ mA}/^{\circ}\text{C}$  above  $T_{EC} = +110^{\circ}\text{C}$  for U and US suffix types.

Beneficial comments (recommendations, additions, deletions) and any pertinent data which may be of use in improving this document should be addressed to: Defense Supply Center, Columbus, ATTN: DSCC/VAC, P. O. Box 3990, Columbus, OH 43216-5000, by using the Standardization Document Improvement Proposal (DD Form 1426) appearing at the end of this document or by letter.

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FSC 5961

1.4 Primary electrical characteristics. Unless otherwise specified, primary electrical characteristics at  $T_A = +25^\circ\text{C}$ .

Types (1)	$V_{F1}$ $I_F = 10 \text{ mA}$	$V_{F2}$	$I_{R1}$ $V_R = 20 \text{ V}$	$I_{R2}$ $V_R = V_{RWM}$	$I_{R3}$ $V_R = 20 \text{ V}$ $T_A = +150^\circ\text{C}$	$I_{R4}$ $V_R = V_{RWM}$ $T_A = +150^\circ\text{C}$	$t_{fr}$ $I_F = 50 \text{ mA}$	$t_{rr}$ $I_{RM} = I_F = 10 \text{ mA}$	$C_{T1}$ $V_R = 0$
	<u>V dc</u>	<u>V dc</u>	<u>nA dc</u>	<u><math>\mu\text{A}</math> dc</u>	<u><math>\mu\text{A}</math> dc</u>	<u><math>\mu\text{A}</math> dc</u>	<u>ns</u>	<u>ns</u>	<u>pF</u>
1N6638, 1N6638U 1N6638US	0.80	1.1 (2)	35	0.5	50	100	20	4.5	2.5
1N6642, 1N6642U, 1N6642US, 1N6642UB 1N6642UBCA, 1N6642UBCC, 1N6642UBD, 1N6642UB2, 1N6642UB2R	0.80	1.2 (3)	25	0.5	50	100	20	5.0	5.0
1N6643, 1N6643U, 1N6643US	0.80	1.2 (3)	50	0.5	75	60	20	6.0	5.0

(1) Suffix "U" devices are structurally identical to the suffix "US" devices.

(2)  $I_F = 200 \text{ mA}$ .

(3)  $I_F = 100 \text{ mA}$ .

## 2. APPLICABLE DOCUMENTS

2.1 General. The documents listed in this section are specified in sections 3 and 4 of this specification. This section does not include documents cited in other sections of this specification or recommended for additional information or as examples. While every effort has been made to ensure the completeness of this list, document users are cautioned that they must meet all specified requirements documents cited in sections 3 and 4 of this specification, whether or not they are listed.

### 2.2 Government documents.

2.2.1 Specifications, standards, and handbooks. The following specifications, standards, and handbooks form a part of this document to the extent specified herein. Unless otherwise specified, the issues of these documents are those listed in the issue of the Department of Defense Index of Specifications and Standards (DoDISS) and supplement thereto, cited in the solicitation (see 6.2).

#### SPECIFICATION

##### DEPARTMENT OF DEFENSE

MIL-PRF-19500 - Semiconductor Devices, General Specification for.

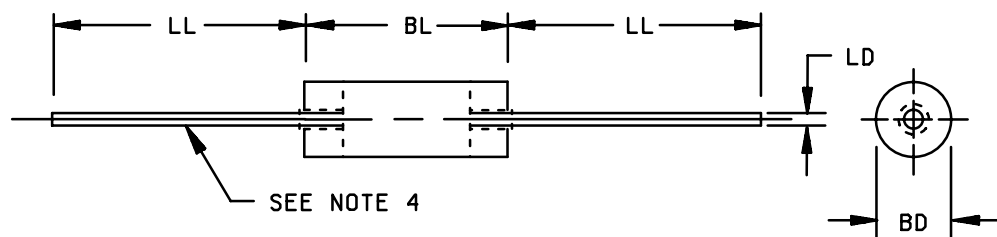
#### STANDARD

##### DEPARTMENT OF DEFENSE

MIL-STD-750 - Test Methods for Semiconductor Devices.

(Unless otherwise indicated, copies of the above specifications, standards, and handbooks are available from the Document Automation and Production Services (DAPS), Building 4D (DPM-DODSSP), 700 Robbins Avenue, Philadelphia, PA 19111-5094.)

2.3 Order of precedence. In the event of a conflict between the text of this document and the references cited herein, the text of this document takes precedence. Nothing in this document, however, supersedes applicable laws and regulations unless a specific exemption has been obtained.



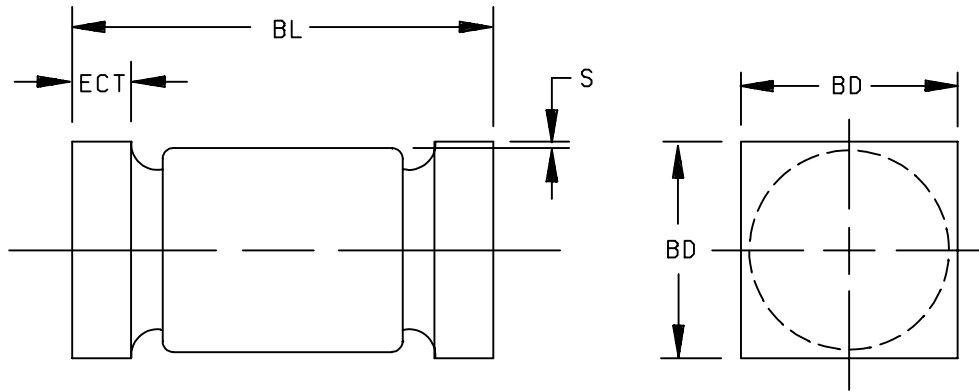
Symbol	Dimensions (see notes 1, 2)				Notes
	Inches		Millimeters		
	Min	Max	Min	Max	
BD	.056	.080	1.42	2.03	3, 5
BL	.130	.180	3.30	4.57	
LD	.018	.022	0.46	0.56	4
LL	1.00	1.50	25.40	38.10	

TYPES 1N6638, 1N6642, AND 1N6643

NOTES:

1. Dimensions are in inches.
2. Metric equivalents are given for general information only.
3. The maximum dimension of BD shall apply for dimension BL.
4. The specified lead diameter applies in the zone between .050 inch (1.27 mm) from the diode body to the end of the lead. Outside of this zone lead shall not exceed BD.
5. The minimum dimension of BD shall apply over at least .065 inch (1.65 mm) of dimension BL.

FIGURE 1. Physical dimensions (similar to DO - 35).



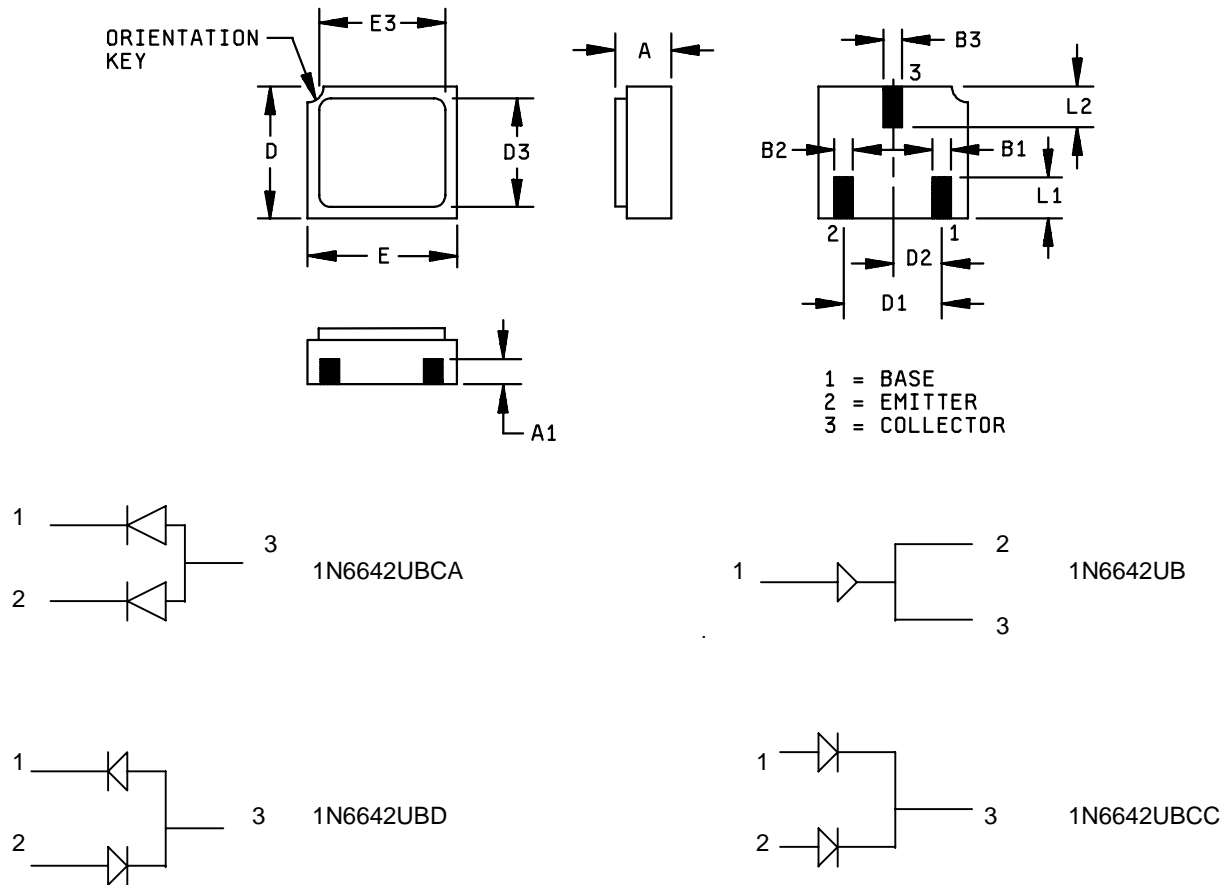
Symbol	Dimensions (see notes 1, 2)			
	Inches		Millimeters	
	Min	Max	Min	Max
BD	.070	.085	1.78	2.16
BL	.165	.195	4.19	4.95
ECT	.019	.028	0.48	0.71
S	.003		0.08	

TYPES 1N6638U, 1N6642U, AND 1N6643U, 1N6638US, 1N6642US, AND 1N6643US

NOTES:

1. Dimensions are in inches.
2. Metric equivalents are given for general information only.

FIGURE 2. Physical dimensions of surface mount family.

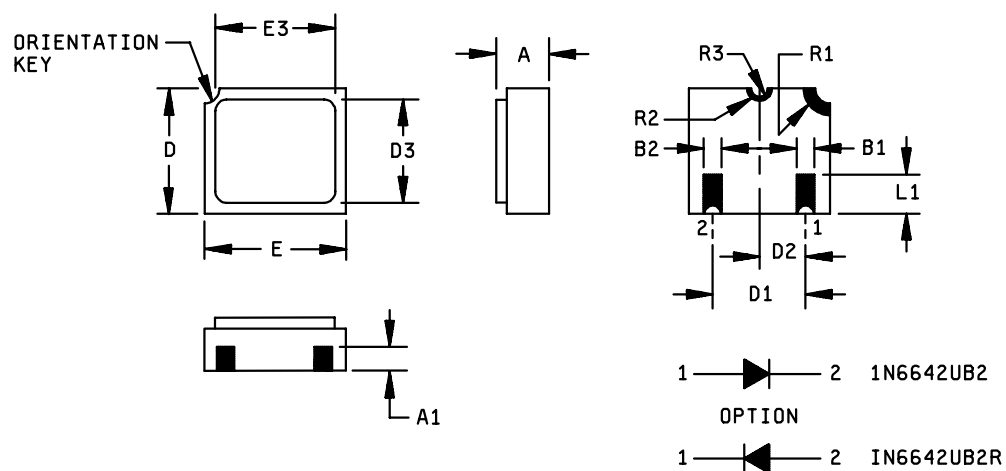


Symbol	Dimensions								
	Inches		Millimeters		Symbol	Inches		Millimeters	
	Min	Max	Min	Max		Min	Max	Min	Max
A	0.046	0.056	0.97	1.42	D1	0.071	0.078	1.81	2.01
A1	0.017	0.023	0.43	0.58	D2				
B1	0.016	0.024	0.41	0.61	D3				
B2	0.016	0.024	0.41	0.61	E	0.115	0.125	2.82	3.18
B3	0.016	0.024	0.41	0.61	E3				
D	0.085	0.105	2.41	2.67	L1	0.022	0.038	0.56	0.96
					L2	0.024	0.036	0.61	0.81

## NOTES:

1. Dimensions are in inches.
2. Metric equivalents are given for general information only.
3. Ceramic package only.

FIGURE 3. Physical dimensions, surface mount (UB versions).



Symbol	Dimensions				Note
	Inches		Millimeters		
	Min	Max	Min	Max	
A	0.046	0.056	0.97	1.42	
A1	0.017	0.035	0.43	0.89	
B1	0.016	0.024	0.41	0.61	Typ
B2	0.016	0.024	0.41	0.61	Typ
R2	0.012		0.3		Typ
D	0.085	0.108	2.41	2.74	
D1	0.071	0.078	1.81	2.01	
D2	0.035	0.039	0.89	0.99	
D3	0.085	0.108	2.41	2.74	
E	0.115	0.128	2.82	3.25	
E3		0.128		3.25	
L1	0.022	0.038	0.56	0.96	
R3	0.008R		0.2R		
R1	0.022R		0.55R		

## NOTES:

1. Dimensions are in inches.
2. Metric equivalents are given for general information only.

FIGURE 4. Physical dimensions, surface mount (2 pin UB version).

### 3. REQUIREMENTS

3.1 General. The requirements for acquiring the product described herein shall consist of this document and MIL-PRF-19500.

3.2 Qualification. Devices furnished under this specification shall be products that are manufactured by a manufacturer authorized by the qualifying activity for listing on the applicable qualified manufacturer's list (QML) before contract award (see 4.2 and 6.3).

3.3 Abbreviations, symbols, and definitions. Abbreviations, symbols, and definitions used herein shall be as specified in MIL-PRF-19500.

3.4 Interface and physical dimensions. Interface and physical dimensions shall be as specified in MIL-PRF-19500, and on figures 1, 2, 3, and 4 herein.

3.4.1 Lead finish. Lead finish shall be solderable in accordance with MIL-PRF-19500, MIL-STD-750, and herein. Where a choice of lead finish is desired, it shall be specified in the acquisition document (see 6.2).

3.4.2 Diode construction. These devices shall be constructed in a manner and using materials which enable the diodes to meet the applicable requirements of MIL-PRF-19500 and this document.

- a. All devices shall be of metallurgically bonded, thermally matched, noncavity-double plug construction in accordance with the requirements of category I (see MIL-PRF-19500).
- b. The 'US' version shall be structurally identical to the non-US versions except for end-cap lead attachment.
- c. The 'US' version shall be structurally identical to the U version.

3.5 Electrical performance characteristics. Unless otherwise specified herein, the electrical performance characteristics are as specified in 1.3, 1.4, and table I herein.

3.6 Electrical test requirements. The electrical test requirements shall be the subgroups specified in table I herein.

3.7 Marking. Marking shall be in accordance with MIL-PRF-19500.

3.8 Polarity. The polarity shall be as specified in MIL-PRF-19500.

3.9 Workmanship. Semiconductor devices shall be processed in such a manner as to be uniform in quality and shall be free from other defects that will affect life, serviceability, or appearance.

#### 4. VERIFICATION

4.1 Classification of inspections. The inspection requirements specified herein are classified as follows:

- a. Qualification inspection (see 4.2).
- b. Screening (see 4.3).
- c. Conformance inspection (see 4.4).

4.2 Qualification inspection. Qualification inspection shall be in accordance with MIL-PRF-19500 and as specified herein.

4.2.1 Group E inspection. Group E inspection shall be conducted in accordance with the conditions specified for subgroup testing in table IX of MIL-PRF-19500, and table II herein. End-point electrical measurements shall be as specified in table I, group A, subgroup 2 herein.

4.2.2 JANJ qualification. For JANJ qualification, 4.4.2.1 herein shall be performed as required by the qualifying activity.

4.2.3 JANJ devices. For JANJ level, 3.3.1 through 3.3.1.3 of MIL-PRF-19500 shall apply, except as modified herein. Supplier imposed requirements as well as alternate screens, procedures, and/or controls shall be documented in the QM plan and must be submitted to the qualifying activity for approval. When alternate screens, procedures, and/or controls are used, in lieu of the JANJ screens herein, equivalency shall be proven and documented in the QM plan. Radiation characterization may be submitted in the QM plan at the option of the manufacturer, however, paragraph 3.3.1.1 of MIL-PRF-19500 is not required. Die lot control and rework for JANJ shall be in accordance with the JANS requirements paragraphs 3.13 and D 3.13.2.1 of MIL-PRF-19500. Lot formation and conformance inspection requirements for JANJ shall be those used for JANTXV devices as a minimum.



4.3 Screening (JANS, JANJ, JANTXV and JANTX levels only). Screening shall be in accordance with table IV of MIL-PRF-19500 and as specified herein. Specified electrical measurements shall be made in accordance with table I herein. Devices that exceed the limits of table I herein shall not be acceptable.

Screen (see table IV of MIL-PRF-19500)	JANS Level	JANJ Level	JANTXV and JANTX Level
1a 1b	Required Required	Not required Required	Not required Required (JANTXV only)
2	Not required	Not required	Not required
3a 3b (1) 3c	Required Not applicable Thermal impedance (see 4.3.2)	Required Not applicable Thermal impedance (see 4.3.2)	Required Not applicable Thermal impedance (see 4.3.2)
4	Not applicable	Not applicable	Not applicable
5	Not applicable	Not applicable	Not applicable
6	Not applicable	Not applicable	Not applicable
7a 7b	Not applicable Required	Not applicable Required	Not applicable Required
8	Required	Not required	Not required
9	$I_{R1}$	$I_{R1}$	Not applicable
10	Method 1038, condition A of MIL-STD-750	Method 1038, condition A of MIL-STD-750	Method 1038, condition A of MIL-STD-750
11	$V_{F2}$ , $I_{R1}$ ; and $V_{(BR)}$ $\Delta I_{R1} \pm 15$ nA dc or 100 percent of initial value whichever is greater.	$V_{F2}$ , $I_{R1}$ ; and $V_{(BR)}$ $\Delta I_{R1} \pm 15$ nA dc or 100 percent of initial value whichever is greater.	$V_{F2}$ and $I_{R1}$
12	Required See 4.3.1	Required T = 240 hours See 4.3.1	Required See 4.3.1
13	Subgroups 2 and 3 of table I herein; $\Delta I_{R1} \leq 100$ percent of initial reading or 15 nA dc, whichever is greater. $\Delta V_{F2} \leq \pm 0.030$ V dc	Subgroups 2 and 3 of table I herein; $\Delta I_{R1} \leq 100$ percent of initial reading or 15 nA dc, whichever is greater. $\Delta V_{F2} \leq \pm 0.030$ V dc	Subgroup 2 of table I herein; $\Delta I_{R1} \leq 100$ percent of initial reading or 15 nA dc, whichever is greater. $\Delta V_{F2} \leq \pm 0.030$ V dc.
14a 14b	Not applicable Optional	Not applicable Optional	Not applicable Optional
15	Required	Not required	Not required
16	Required	Required	Not required
17	Not required	Required Subgroup 2 of table I herein	Not required

(1) Thermal impedance shall be performed any time after screen 3.

4.3.1 Power burn-in conditions. Power burn-in conditions are as follows: Method 1038, condition B,  $T_A$  = room ambient as defined in the general requirements of MIL-STD-750, (see 4.5);  $V_R$  = rated  $V_{RWM}$ ;  $f$  = 50-60 Hz;  $I_O$  = 300 mA. An alternative of  $I_F$  (dc) = 300 mA may be used (at  $T_A$  = room ambient as defined in the general requirements of 4.5 of MIL-STD-750).

4.3.2 Thermal impedance  $Z_{\theta JX}$  measurements for screening. The  $Z_{\theta JX}$  measurements shall be performed in accordance with method 3101 of MIL-STD-750. The maximum limits and conditions for  $Z_{\theta JX}$  in screening (table IV of MIL-PRF-19500) shall be derived statistically by each vendor by means of actual measurements which characterize the die attach process, not to exceed the group A limit.

4.4 Conformance inspection. Conformance inspection shall be in accordance with MIL-PRF-19500.

4.4.1 Group A inspection. Group A inspection shall be conducted in accordance with table V of MIL-PRF-19500, table I herein, and as specified herein. Electrical measurements (end-points) shall be in accordance with table I, group A, subgroup 2 herein. The following test conditions shall be used for  $Z_{\theta JX}$ , group A inspection.

- a.  $I_H$  forward heating current ..... 1 - 2 A.
- b.  $t_H$  heating time ..... 10 ms.
- c.  $I_M$  measure current ..... 1 mA to 10 mA.
- d.  $t_{MD}$  measurement delay time ..... 100  $\mu$ s maximum.

The maximum limit for  $Z_{\theta JX}$  under these test conditions is  $Z_{\theta JX(max)} = 25^\circ\text{C/W}$ .

4.4.2 Group B inspection. Group B inspection shall be conducted in accordance with the conditions specified for subgroup testing in tables VIa (JANS) and VIb (JAN, JANTX, JANTXV, and JANJ) of MIL-PRF-19500 and paragraphs 4.4.2.1 and 4.4.2.2 herein. Electrical measurements (end-points) shall be in accordance with table I, group A, subgroup 2.

4.4.2.1 Group B inspection, table VIa (JANS) of MIL-PRF-19500.

Subgroup	Method	Conditions
B4	1037	$V_R$ = rated $V_{RWM}$ , $T_A$ = room ambient as defined in 4.5 of MIL-STD-750, $f$ = 50-60 Hz (see 4.5.1); $t_{on} = t_{off}$ = 1 minute minimum; 2,000 cycles; $I_O$ = 300 mA; in lieu of ac conditions, a dc condition of $I_F$ = 400 mA may be used.
B5	1027	Option 1: Adjust $T_A$ or $I_O$ to obtain a minimum $T_J$ of $+275^\circ\text{C}$ , $t$ = 96 hours. $I_O$ = 300 mA minimum, $V_R$ = rated $V_{RWM}$ , $f$ = 50-60 Hz (see 4.5.1),
B5	1027	Option 2: Adjust $T_A$ or $I_O$ to obtain a minimum $T_J$ of $+200^\circ\text{C}$ , $t$ = 1,000 hours. $I_O$ = 300 mA minimum, $V_R$ = rated $V_{RWM}$ , $f$ = 50-60 Hz (see 4.5.1).
B6	3101 or 4081	$L$ = .375 inch (9.53 mm); $R_{\theta JL}$ = $160^\circ\text{C/W}$ maximum (see 4.5.4); $R_{\theta JEC}$ = $50^\circ\text{C/W}$ maximum (see 4.5.4).

4.4.2.2 Group B inspection, table VIb (JAN, JANTX, JANTXV and JANJ) of MIL-PRF-19500. Leaded samples from the same lot may be used in lieu of U and US suffix sample for life test.

<u>Subgroup</u>	<u>Method</u>	<u>Conditions</u>
B3	1027	$T_A$ = room ambient as defined in 4.5 of MIL-STD-750, $V_{(pk)} = \text{rated } V_{RWM}$ ; $f = 50\text{-}60$ Hz (see 4.5.1); $I_O = 300$ mA dc; adjust $T_A$ to obtain a minimum $T_J$ of $+150^\circ\text{C}$ .
B5	3101 or 4081	See 4.5.4.
B6	1032	$T_A = +175^\circ\text{C}$ .

4.4.3 Group C inspection. Group C inspection shall be conducted in accordance with the conditions specified for subgroup testing in table VII of MIL-PRF-19500, and as follows. Electrical measurements (end-points) shall be in accordance with table I, group A, subgroup 2 herein.

4.4.3.1 Group C inspection, table V of MIL-PRF-19500.

<u>Subgroup</u>	<u>Method</u>	<u>Conditions</u>
C2	2036	Tension - test condition A; weight = 4 pounds, $t = 15$ s; lead fatigue = condition E (not applicable to U and US suffix types).
C6	1026	1,000 hours minimum at $T_A$ = room ambient as defined in 4.5 of MIL-STD-750, $V_{(pk)} = \text{rated } V_{RWM}$ ; $f = 50 - 60$ Hz (see 4.3.1); $I_O = 300$ mA dc; adjust $T_A$ to obtain a minimum $T_J$ of $+150^\circ\text{C}$ .

4.5 Methods of inspection. Methods of inspection shall be as specified in the appropriate tables and as follows.

4.5.1 Life test. These tests shall be conducted with a half-sine waveform of the specified peak voltage impressed across the diode in the reverse direction followed by a half-sine waveform of the specified average rectified current. The forward conduction angle of the rectified current shall be neither greater than 180 degrees, nor less than 150 degrees.

4.5.2 Forward-recovery voltage and time. Forward recovery time shall be measured as the time interval between zero time and the point where the pulse has decreased to 110 percent of the steady-state value of  $V_F$  when  $I_F = 50$  mA dc. The maximum rise time of the response detector shall be 1 ns. The maximum forward recovery voltage ( $V_{fr}$ ) during the forward recovery interval shall also be measured.

4.5.4 Thermal resistance. Thermal resistance measurement shall be performed in accordance with method 3101 or 4081 of MIL-STD-750. Read and record data and information shall be included in the qualification report. Forced moving air or draft shall not be permitted across the devices during test. The maximum limit for  $R_{\theta JL}$  under these test condition shall be  $R_{\theta JL(max)} = 160^{\circ}\text{C/W}$  and  $R_{\theta JEC(max)} = 50^{\circ}\text{C/W}$ . The following conditions shall apply:

- a.  $I_H = 75 \text{ mA}$  to  $300 \text{ mA}$ .
- b.  $t_H = 25 \text{ seconds}$  minimum.
- c.  $I_M = 1 \text{ mA}$  to  $10 \text{ mA}$ .
- d.  $t_{MD} = 100 \mu\text{s}$  maximum.

LS = Lead spacing =  $9.53 \text{ mm}$  (.375 inch) as defined on figure 5.

LS = 0 for 'US' or 'U' versions.

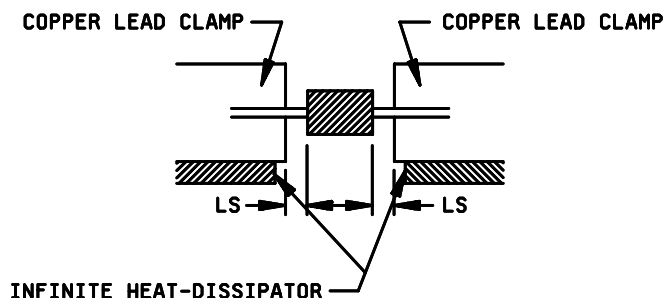


FIGURE 5. Mounting arrangement.

4.5.5 Pulse measurements. Conditions for pulse measurements shall be as specified in section 4 of MIL-STD-750.

TABLE I. Group A inspection.

Inspection 1/ 2/	MIL-STD-750		Symbol	Limits		Unit
	Method	Conditions		Min	Max	
<u>Subgroup 1</u>						
Visual and mechanical examination	2071					
<u>Subgroup 2</u>						
Thermal impedance	3101	See 4.3.2	$Z_{\theta JX}$		25.0	°C/W
Forward voltage	4011	$I_F = 10 \text{ mA dc pulsed}$	$V_{F1}$		0.8	V dc
1N6638					0.8	V dc
1N6642					0.8	V dc
1N6643					0.8	V dc
Forward voltage	4011		$V_{F2}$			
1N6638		$I_F = 200 \text{ mA pulsed}$			1.1	V dc
1N6642		$I_F = 100 \text{ mA pulsed}$			1.2	V dc
1N6643		$I_F = 100 \text{ mA pulsed}$			1.2	V dc
Breakdown voltage	4021	$I_R = 100 \text{ } \mu\text{A dc}$	$V_{BR}$			
1N6638				150		V dc
1N6642				100		V dc
1N6643				75		V dc
Reverse current	4016	DC method; $V_R = 20 \text{ V dc}$	$I_{R1}$		35	nA dc
1N6638					25	nA dc
1N6642					50	nA dc
1N6643						
Reverse current	4016	DC method	$I_{R2}$			
1N6638		$V_R = 125 \text{ V dc}$			500	nA dc
1N6642		$V_R = 75 \text{ V dc}$			500	nA dc
1N6643		$V_R = 50 \text{ V dc}$			500	nA dc
<u>Subgroup 3</u>						
High temperature operation		$T_A = +150^\circ\text{C}$				
Reverse current	4016	DC method, $V_R = 20 \text{ V dc}$	$I_{R3}$			
1N6638					50	$\mu\text{A dc}$
1N6642					50	$\mu\text{A dc}$
1N6643					75	$\mu\text{A dc}$

See footnotes at end of table.

TABLE I. Group A inspection - Continued.

Inspection <u>1/ 2/</u>	MIL-STD-750		Symbol	Limits		Unit
	Method	Conditions		Min	Max	
<u>Subgroup 3</u> - Continued						
Reverse current	4016	DC method	$I_{R4}$			
1N6638		$V_R = 125$ V dc			100	$\mu$ A dc
1N6642		$V_R = 75$ V dc			100	$\mu$ A dc
1N6643		$V_R = 50$ V dc			160	$\mu$ A dc
Forward voltage	4011	$I_F = 10$ mA dc pulsed	$V_{F3}$			
1N6638					0.65	V dc
1N6642					0.80	V dc
Low temperature operation		$T_A = -55^\circ\text{C}$				
Forward voltage	4011	Pulsed	$V_{F4}$			
1N6638		$I_F = 200$ mA pulsed			1.2	V dc
1N6642		$I_F = 100$ mA pulsed			1.2	V dc
1N6643		$I_F = 100$ mA pulsed			1.4	V dc
<u>Subgroup 4</u>						
Capacitance	4001	$V_R = 0$ V dc; $V_{\text{sig}} = 50$ mV(p-p) $f = 1$ MHz	$C_{T1}$			
1N6638					2.5	pF
1N6642					5.0	pF
1N6643					5.0	pF
Capacitance	4001	$V_R = 1.5$ V dc; $V_{\text{sig}} = 50$ mV(p-p) $f = 1$ MHz	$C_{T2}$			
1N6638					2.0	pF
1N6642					2.8	pF
1N6643					2.8	pF
Reverse recovery time	4031	Condition A, $I_F = I_R = 10$ mA dc	$t_{rr}$			
1N6638					4.5	ns
1N6642					5.0	ns
1N6643					6.0	ns
Scope display	4023	-3, -6, -7, -8, -9, -10, -11				
<u>Subgroup 5</u>						
Not applicable						

See footnotes at end of table.

## MIL-PRF-19500/578E

TABLE I. Group A inspection - Continued.

Inspection <u>1/</u>	MIL-STD-750		Symbol	Limits		Unit
	Method	Conditions		Min	Max	
<u>Subgroup 6</u>						
Surge current	4066	$I_{FSM} = 2.5 \text{ A(pk)}$ ten surges at one per minute (max) surge duration of 1/120 seconds				
Electrical measurements		See table I, group A, subgroup 2.				
<u>Subgroup 7</u>						
Forward recovery voltage and time	4026	$I_F = 50 \text{ mA dc}$ (see 4.5.2)	$V_{fr}$ $t_{fr}$		5.0 20.0	V(pk) ns

1/ For sampling plan, see MIL-PRF-19500.

2/ Electrical characteristics for "U" and "US" suffix versions are identical to the corresponding non "U" and "US" suffix versions unless otherwise noted

TABLE II. Group E inspection (all quality levels) for qualification only.

Inspection	MIL-STD-750		Qualification Inspection
	Method	Conditions	
<u>Subgroup 1</u>			22 devices, c = 0
Thermal shock (glass strain)	1056	Condition A; 2,000 cycles	
Hermetic seal	1071	Gross leak only	
Electrical measurement		See table I, group A, subgroup 2	
<u>Subgroups 2 and 3</u>			
Not applicable			
<u>Subgroup 4</u>			22 devices, c = 0
Thermal resistance, junction to lead	3101	$L = .375 \text{ inch (9.53 mm)}$ $R_{\theta JL} = 160^\circ\text{C/W}$ maximum; $R_{\theta JEC} = 50^\circ\text{C/W}$ ; (see 4.5.4)	
<u>Subgroup 5</u>			15 devices, c = 0
Potted environment test	1054		

## 5. PACKAGING

5.1 Packaging. For acquisition purposes, the packaging requirements shall be as specified in the contract or order (see 6.2). When actual packaging of materiel is to be performed by DoD personnel, these personnel need to contact the responsible packaging activity to ascertain requisite packaging requirements. Packaging requirements are maintained by the Inventory Control Points' packaging activity within the Military Department or Defense Agency, or within the Military Departments' System Command. Packaging data retrieval is available from the managing Military Departments' or Defense Agency's automated packaging files, CD-ROM products, or by contacting the responsible packaging activity.

## 6. NOTES

(This section contains information of a general or explanatory nature that may be helpful, but is not mandatory.)

6.1 Intended use. The notes specified in MIL-PRF-19500 are applicable to this specification.

6.2 Acquisition requirements. Acquisition documents must specify the following:

- a. Title, number, and date of this specification.
- b. Issue of DoDISS to be cited in the solicitation, and if required, the specific issue of individual documents referenced (see 2.2).
- c. Packaging requirements (see 5.1).
- d. Lead finish (see 3.4.1).

6.3 Qualification. With respect to products requiring qualification, awards will be made only for products which are, at the time of award of contract, qualified for inclusion in Qualified Manufacturers' List (QML) whether or not such products have actually been so listed by that date. The attention of the contractors is called to these requirements, and manufacturers are urged to arrange to have the products that they propose to offer to the Federal Government tested for qualification in order that they may be eligible to be awarded contracts or orders for the products covered by this specification. Information pertaining to qualification of products may be obtained from Defense Supply Center, Columbus, ATTN: DSCC/VQE, P.O. Box 3990, Columbus, OH 43216-5000.

6.4 Cross reference substitution list. JANS1N4148 is prohibited and will not longer be built or qualified. Devices in stock are acceptable. A PIN for PIN replacement table follows, and these devices are directly interchangeable. The 1N4148 design is unsuitable for space flight applications.

Non-preferred PIN	Preferred PIN
JANS1N4148-1 JANS1N4148-1UR	JANS1N6642 JANS1N6642US

6.5 Changes from previous issue. Marginal notations are not used in this revision to identify changes with respect to the previous issue due to the extent of the changes.



Custodians:

Army - CR  
Navy - NW  
Air Force - 11  
NASA - NA  
DLA - CC

Preparing activity:

DLA - CC

(Project 5961-2462)

Review activities:

Army - AR, MI, SM  
Navy - AS, MC  
Air Force - 19

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2. The submitter of this form must complete blocks 4, 5, 6, and 7.
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**I RECOMMEND A CHANGE:**

1. DOCUMENT NUMBER  
MIL-PRF-19500/578E

2. DOCUMENT DATE  
21 June 2001

**3. DOCUMENT TITLE**

SEMICONDUCTOR DEVICE, DIODE, SILICON, SWITCHING, 1N6638, 1N6642, 1N6643, 1N6638U, 1N6642U, 1N6643U, 1N6638US, 1N6642US, 1N6643US, 1N6642UB, 1N6642UB2, 1N6642UBR2, JAN, JANTX, JANTXV, JANJ, AND JANS

**4. NATURE OF CHANGE** (Identify paragraph number and include proposed rewrite, if possible. Attach extra sheets as needed.)**5. REASON FOR RECOMMENDATION****6. SUBMITTER**

a. NAME (Last, First, Middle initial)

b. ORGANIZATION

c. ADDRESS (Include Zip Code)

d. TELEPHONE (Include Area Code)  
COMMERCIAL  
DSN  
FAX  
EMAIL

7. DATE SUBMITTED

**8. PREPARING ACTIVITY**

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P.O. Box 3990  
Columbus, OH 43216-5000

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